Small Business Innovation Research/Small Business Tech Transfer

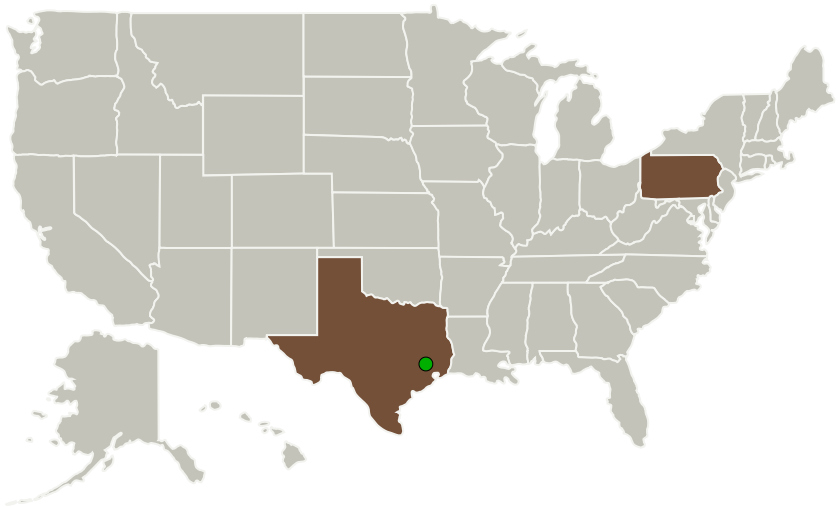
Context-Augmented Robotic Interaction Layer (CARIL), Phase I

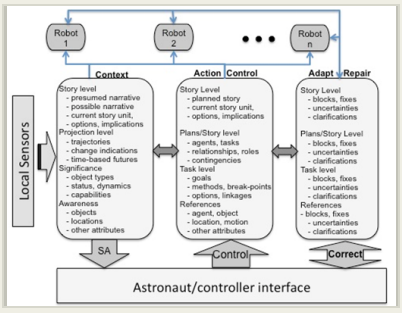
Completed Technology Project (2014 - 2014)

Project Introduction

Today, as humans reach beyond the earth to near and deep space, there is obvious and urgent need to augment the capabilities of human astronauts and (ground-) controllers with smarter and more capable automation. In conventional approaches to human-robot interactions for supervisory control paradigms, coordination often breaks down for a variety of reasons and progress toward interactive goals is often impeded due to the inability of the work system to adapt to context shifts. Hence, human-robot teams can be almost entirely non-adaptive. To address these complex problems, CHI Systems and the Institute for Human Machine Cognition have teamed to create a human-robot interaction system based on recent theories and tools developed by CHI Systems leveraging cognitive representations of shared context as basis for a fundamentally new approach to human-robotic interaction. This approach includes a framework for representing context and using it to support decision making and control of automation and will form the core of the proposed solution termed the Context-Augmented Robotic Interaction Layer or CARIL. CARIL will enable efficient and effective human-robot control-oriented cooperation through the use of adaptive behaviors to mediate cooperation between humans and robots. Phase I will focus on development and demonstration of the CARIL concept.

Primary U.S. Work Locations and Key Partners





Context-Augmented Robotic Interaction Layer (CARIL) Project Image

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Organizations Performing Work	Role	Type	Location
CHI Systems, Inc.	Lead Organization	Industry	Plymouth Meeting, Pennsylvania
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Pennsylvania	Texas

Project Transitions

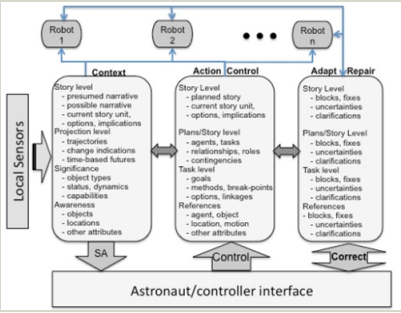
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140733)*

Images



Project Image
Context-Augmented Robotic Interaction Layer (CARIL) Project Image
(https://techport.nasa.gov/image/136222)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
CHI Systems, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

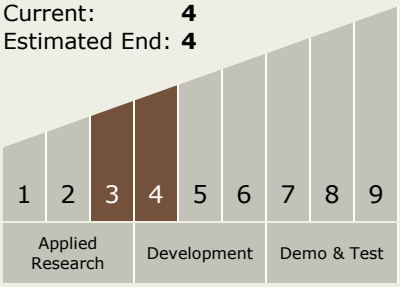
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Wayne W Zachary

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.4 Human-Robot Interaction
    - TX04.4.1 Multi-Modal and Proximate Interaction

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System